



# An Econometric Analysis of Consumption Behavior of Nepalese People

Laxmi Raj Bhatta 

<sup>1</sup> Morgan Int'l College,  
Kathmandu, Nepal

\*Corresponding email:  
klaxmanbhatta@gmail.com

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## Abstract

**Background:** Consumption is a crucial variable, influenced by level of income. The relationship between income and consumption referred as MPC.

**Objectives:** The main objective of the study is to find the relationship between current income and current consumption at the national and local levels.

**Methods:** During data analysis, we collected cross-sectional data (current income and expenditure) using a questionnaire from the study area. However, the time series data were obtained from a secondary source, and the econometric model was built on the absolute income hypothesis (AIH).

**Results:** MPCs have four different values. One is for the national level, and three are for the local level. The MPCs from cross-sectional data were derived according to the high, middle, and small income levels. The national MPC is 0.0000117 and local-level MPCs are 0.55, 0.46, and 0.92. The MPC of the middle-income group and national levels were not significant however the other two are significant.

**Implications:** The present study shows that the consumption and income relationship is stronger for high-income and low-income groups than for the middle-income and national level. However, the study was limited to rural individuals with agriculture as their primary occupation, and other factors such as debt, savings, and population size were not considered. The facts do not support the national level econometric consumption function. Therefore, we concluded that income is not the determining factor of consumption in the Nepalese perspective.

**Conclusions:** The income level is an important factor in determining the consumption level of people. This study was carried out based on the time series and cross-sectional data. There are four marginal propensities to consume (MPC), i.e. one for the national level and three for the local level.

**Paper Types:** Research Paper

**Keywords:** Income, MPC, Time Series and Cross-sectional Data.



## Introduction

The consumption pattern of Nepalese people is changing rapidly. Several factors are responsible for this change, including economic growth, urbanization, and changing lifestyles. As a result, there is a need to understand the changing consumption pattern of Nepalese people in order to develop effective policies. Chaudhary (2017) studied the relationship between aggregate consumption and its determinants in Nepal using the ARDL model and data from 1975 to 2015. The study reported that real income is a robust determinant of aggregate consumption in the long run. However, in the short run, there is a positive relationship between real domestic currency depreciation and real consumption. The study also reported that actual interest and inflation rates negatively effect on aggregate consumption. Overall, this study highlights the importance of understanding the determinants of aggregate consumption for macroeconomists, policymakers, and other stakeholders. Similarly, using econometric methods, Adhikari (2015) investigated the validity of Keynes' Absolute Income Hypothesis (AIH) in the Nepalese context. This study concluded that AIH is partially applicable in the long run but not in the short run. The study also found that current real consumption is determined by real disposable income in the preceding time and that both consumption and disposable income contribute to the variation of consumption. The study suggests that the government of Nepal should launch employment and income-generating programs to increase income and encourage consumption. Additionally, more investment is required in industrialization, and income equality must be maintained through a progressive tax system.

Theodossiou and Zangelidis (2009) inspected the impact of absolute income and subjective social status assessment on the health of individuals aged 50 to 65 in six European countries. It addresses the medical evidence suggesting that an individual's position in the social hierarchy can affect their mental and physical well-being. The findings reveal that personal income positively, albeit modestly, influences health. Notably, subjective social status assessment significantly effect on various health indicators. Moreover, the study demonstrates that individuals who grew up in disadvantaged families at 14 tend to have poorer physical and mental health. Similarly, Greenberg (2017) investigated the relationship between income and life satisfaction in Peru. The study argued a positive correlation between income and life satisfaction for Mulatos and Peruanos. However, the study also found income and life satisfaction differences between the two ethnic groups. For example, Mulatos more sensitive to changes in income than Peruanos. Additionally, the study found that non-monetary factors, such as health, education, and familial factors, also affect life satisfaction. The findings of this study can help to inform policies that aim to improve life satisfaction in Peru. A bit different, Tekin (2018) examined the panel data of 73 developing countries by using the concept of the absolute income hypothesis with the help of fixed and random effects estimators. The current income level was valid for developing countries to determine the consumption pattern.

(Gross Domestic Product) GDP refers consuming goods and services to meet human needs; consumption level is a significant component. Many academics believed that we could use the consumption level and economic dynamics to study the economic performance of any nation. Through the prism of consumer behavior, there is a precise link between income level and consumption. After the Great Depression, consumption became a key factor in macroeconomic policy. It is example of dynamic choice problem. Consumption decisions result in savings - and open up funds for investment and capital growth (Attanasio, 1998). Every economy's consumption expenditure ranges from 50% to 70% of total spending, significantly influences the formulation of macroeconomic policies (Fernandez-Corugedo, 2004). Similarly to this, private consumption is a crucial factor in macroeconomic policy. Information on private spending and saving relationships is also required in order to alter any economy's financial and economic systems (Al Gahtani et al., 2020).

This study examines the correlation between income and consumption at national and local levels. The study uses time series, cross-sectional data, and the econometric model based on the absolute income

hypothesis. The cross-sectional data used in the analysis were gathered specifically for the master's thesis in 2063 B.S. This paper is organized as follows: Section II critically reviews the relevant literature to this study. Section III outlines the research method adopted for this study. Sections IV and V analyze the data and discuss the analysis, respectively. Finally, Section VI concludes the study.

## Literature Review

### *Theoretical Review*

J. M. Keynes, a British economist first examined the concept of "consumption" in 1936 by establishing the idea of the absolute income hypothesis, which allowed him to examine the relationship between income and consumption. Later, in 1946, by calculating the APC (Average Propensity Consume) of both time series and cross-sectional data for the short and long term, Kuznets established a new assertion opposing to the Keynesian viewpoint (Liaqat et al., 2018). Consumption function estimates for the pre-war (1929 to 1940) and post-war (1940s and after the war) periods varied. According to post-war research, the APC (Average Propensity to Consume) does not decrease with income level (Spanos, 1989). The relationship between aggregate consumption and income level is entitled as consumption function, which is the cornerstone of macroeconomic thinking after the publication of Keynes's magnum opus, *The General Theory*. Keynes asserted that consumption expenditure is a highly dependable and stable function of current income (Friedman, 2018a). The Keynesian consumption function is the absolute income hypothesis (AIH), which is the stable but not the linear function of disposable income. There is a non-proportional relationship between income and consumption. In the short run, APC is more than MPC. However when income increases, MPC is closer to APC in the long run (Alimi, 2013).

Keynes (1936) defined the relationship between consumption and income from the following statement, *Upon we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of the experience.....that men are disposed of, as a rule, and on average, to increase their consumption as their income increases, but not by as much as the increase in their income Keynes.*

### *Empirical Review*

The absolute income hypothesis was studied empirically at different times in various countries by using different methodologies.

Using absolute income hypothesis perspectives, Arioglu & Tuan (2011) examined the relationship between consumption and income in eight countries (Austria, Belgium, Denmark, Finland, Germany, Italy, UK, and USA). The researchers employ the Engle and Granger methodology and find that consumption and income exhibit unit roots across all countries. However, the long-run relation estimation regression residuals for Austria, Belgium, Finland, and Germany have unit roots, while the residuals for Denmark, Italy, UK, and USA do not. This finding implies that consumption and income series are co-integrated in the latter group of countries. Lastly, the coefficients derived from the error correction model estimation for Italy, the UK, and the USA align with the expected signs.

Musa and Allah (2018) aimed to estimate the consumption function in Sudan and investigated the factors influencing it. The main question addressed in the paper was the identifying the factors that impact the consumption function in Sudan. The study utilized both descriptive and analytical approaches. The key hypotheses examined were the positive relationship between income and consumption, and the inverse relationship between inflation and the exchange rate. The findings revealed a positive association between consumption and income, indicating a negative correlation between inflation and

the exchange rate. Based on these results, the paper suggests implementing economic policies that enhance the understanding of lower-income consumers, thereby improving their decision-making to maximize consumption.

Murota and Ono (2010)) proposed a microeconomic foundation for the multiplier effect and the consumption function using a dynamic optimization model. The model explains a shortage of aggregate demand and unemployment. The study finds that government purchases boost aggregate demand through a multiplier-like process, but mechanism differs from what is typically assumed. The government purchases do not increase disposable income directly, but they do moderate deflation. This makes money holding costly, which stimulates consumption.

K.g and W.n.s (2018) investigated the relationship between fiscal and monetary policies and households' private consumption expenditure in South Africa, focusing on the relevance of the absolute income hypothesis. The study compares Friedman's permanent income hypothesis, which suggests that consumption is determined by lifetime income expectations, with Keynes' absolute income hypothesis, which argues that fiscal stimulus policies affect consumption. The research utilizes econometric equations with quarterly data from 1984 to 2015 and employs co- integration techniques. In Africa, the findings indicate that households' previous disposable income rather than their current income influences the private consumption expenditure. The study concludes that the absolute income hypothesis is not suitable for explaining consumption in the country; and suggests that fiscal stimulus policies may not effectively increase economic activity and employment if households prioritize debt repayment over additional consumption.

Saraswati et al. (2022) focused on analyzing the impact of financial technology on household consumption in Indonesia, within the theoretical framework the absolute income hypothesis. The researchers employed the partial adjustment model (PAM) approach and the Chow test to identify structural changes in the households' consumption function from 1990 to 2017. The findings reveal that the development of financial technology, specifically the era of fintech 3.0 since 2000, has led to a structural change in the consumption behavior of Indonesian households. Moreover, the partial adjustment model indicates that financial technology positively influences on household consumption in both the short run and the long run. These results suggest that fintech can be a driving force for economic growth in Indonesia. However, they also indicate that increased reliance on fintech may lead to higher inflation rates due to increased consumer spending.

Svensson (2017) investigated the impact of absolute and relative income on subjective well-being (SWB) in Sweden using ordered probit techniques. The study examines various agents based on their age, population density, and highest education level, and income level, country of birth, employment status, and partnership status. The findings indicate that relative income has a greater influence on SWB among agents who are middle-aged, female, born in Sweden, have lower education levels, live in densely populated areas, are employed, and live with a partner. On the other hand, absolute income plays a more significant role in SWB for agents who are middle-aged, not born in Sweden, single, male, unemployed, have lower education levels, and reside in densely populated areas.

Rahayu (2016) investigated the determinants of happiness in Indonesia using cross-sectional data from the IFLS wave IV in 2007. The research employs the Conditional Mixed Process (CMP) and Ordinal Generalized Linear Model (OGLM) to address income endogeneity and heteroscedasticity. The findings reveal that absolute income, relative income, education level, perceived health, and certain aspects of social capital, such as willingness to help, tolerance, security, and the importance of religion and religiosity in elections, significantly influence happiness in Indonesia. Additionally, trust in people of the same ethnicity, religion, and neighbors for essential matters do not impact happiness, indicating any discrimination based on ethnicity or religion. Demographic characteristics show that

married individuals, non-household heads, urban residents, those living outside Java-Bali islands, followers of Islam, and individuals with higher religious commitment tend to be happier. There is no significant difference in happiness between genders and ethnicities, and the happiness-income relationship suggests that the Easterlin Paradox does not hold true in Indonesia.

Cui & Chang (2021) examined the relationship between income and health in China. The study used panel data from 2011, 2014, and 2017 of the Chinese Longitudinal Healthy Longevity Survey (CLHLS). The study found that relative income, rather than absolute income, has a significantly negatively impacts health performance. The study also found that health inequality persists throughout life but remains relatively stable, without significant expansion or convergence. The study suggests that as China moves to higher incomes and accelerated ageing, the Chinese government should pay more attention to income inequality and be alert to the risks of “income-healthy poverty” traps.

Khan et al. (2014) assessed the consumption functions of SAARC countries using annual data from 1971 to 2013. The study found that in the short run, consumers’ consumption decisions are based on current income, while in the long run- consumers anticipate their future income and make consumption decisions based on permanent income. The study also found that the marginal propensity to consume (MPC) is higher in the long run than in the short run. These findings suggest that consumers in SAARC countries are forward-looking and that their consumption decisions are based on their expectations about future income.

## Methodology

### *Study Area*

The study area is Shreepur VDC, Kailai district. The total population of this VDC is 13,512 of 2035 households. The population of Tharu, Kshetri, Dalit and Braman are 3315, 3330, and 1380 respectively. And the remaining are people of other castes. Eighty-one households were selected for the information collection. In this area, the main occupation of the people is agriculture. The main source of income is agricultural products, and the derived data of the products are converted into monetary value by multiplying product price by the quantity. The area is covered by the Tharu community, who cannot express their exact income and expenditure; therefore, the data related to them was estimated. A 5% error and a 95% confidence intervals were assumed.

### *Data Collection Techniques*

The study primarily used time series and cross-sectional data. Time series data were obtained from secondary sources such as the Nepalese government’s Economic Survey, specifically data on total income (GDP) and total expenditure at current prices from FY 1980/1981 to FY 2003/04 was analyzed to determine the national relationship between income and expenditure. Using a questionnaire, we collected cross-sectional data from 81 randomly selected households in the study area, Shreepur VDC, Kailali district. The households were categorized into three groups based on their income levels. Using a questionnaire, we collected cross-sectional data from 81 randomly selected households in the study area, Shreepur VDC, Kailali district. The total samples were divided into three groups according to their income levels i.e. high-income level (100400-6338200), middle-income level (62600-99200), and low-income level (17200-58200). Four econometric models were constructed based on the time series and cross-sectional data. Python was used to estimate the values of the econometric models. Simply, T-test, F-test etc. were used to test the hypothesis of the model.

In the time series data, the graph was used to check the variation in both income and expenditure. The formula was used to determine the stationary situation of the data. The difference method was also used when both variables were non-stationary.. The first difference of a time series variable Y at time t is calculated as

$$\Delta Y(t) = Y(t) - Y(t-1)$$

This formula subtracts the previous observation from the current one, resulting in a series of differences. The second difference of a time series variable Y at time t is calculated as:

$$\Delta^2 Y(t) = \Delta Y(t) - \Delta Y(t-1)$$

Null Hypothesis

$H_0$  = There is a positive relationship between current income level and current consumption

Alternative Hypothesis:

$H1$  = There is a non-positive relationship between current income level and current consumption.

An econometric model based on the absolute income hypothesis was developed to study the relationship between income and expenditure at both national and local levels. The econometric consumption function is given below:

$$C_t = \alpha + \beta Y_t + \varepsilon$$

Where,

$C_t$  = Aggregate Consumption

$Y_t$  = Aggregate Income

$\alpha$  = Autonomous Consumption

$\beta$  = Marginal Propensity to consume ( $0 \leq MPC \leq 1$ )

$\varepsilon$  = Error

The marginal propensity to consume (MPC) is a measure of how much of an increase in income is spent on consumption. It is calculated by dividing the change in consumption by the change in income. The MPC is typically between 0 and 1, meaning that people tend to spend less than all of their income. The MPC is important in economics because it can predict how income changes will affect consumption.

## Data Analysis

This section covers the analysis of time series and cross-sectional data. The time series data are analyzed on the basis of the national data to calculate the MPC (Marginal Propensity to Consume), and cross-sectional data are analyzed by dividing them into three different groups, i.e. high, middle, and small income levels. A detailed explanation is given below.

### National Level

In analyzing time series data, a stationary test was conducted to assess the behavior of the income and expenditure variables. However, the results indicated that both variables were non-stationary. To address this issue, we applied difference method to both variables. The first-order difference successfully rendered the income variable stationary, indicating that the changes in income over time were consistent. On the other hand, it was necessary to apply a second-order difference to the expenditure variable in order to achieve stationary, indicating that the fluctuations in expenditure required further adjustment to establish a stable pattern. In the following diagrams, the first figure presents the difference nature of the income and expenditure patterns, and the second figure shows the non-stationary pattern of income and expenditure. The stationary econometric consumption function is also given below.

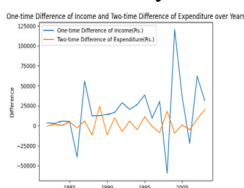


Fig.1

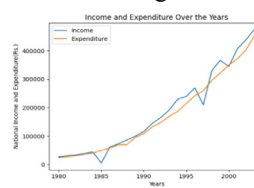


Fig.2

$$C_t = 0.000005249 + 0.0000117Y_t + \varepsilon$$

F-statistic: 3.268

Prob (F-statistic) = 0.0616

R-square = 0.26, Adjusted R- square = 0.18

Std err: 0.0000201 0.00000504

T-test: 0.261 2.323

P-value: 0.797 0.797

$C_t$  = Two-time differences of expenditure (Rs.)

$Y_t$  = One-time difference of income (Rs.)

The analysis results provide a comprehensive understanding of the regression model represented by the equation  $C_t = 0.000005249 + 0.0000117Y_t + \varepsilon$ . Firstly, the coefficients shed light on the relationship between the variables. The coefficient of  $Y_t$  (0.0000117) indicates that for every unit increase in  $Y_t$ ,  $C_t$  is expected to increase by 0.0000117. This coefficient is statistically significant, evidenced by its high t-statistic of 2.323. Secondly, the standard errors provide an estimate of the precision of the coefficient estimates. The standard error for the constant term is 0.0000201, while for  $Y_t$ , it is 0.00000504. These small standard errors suggest that the coefficient estimates are relatively precise. Moving on to the t-tests and p-values, the t-statistic for the constant term is 0.261, resulting in a p-value of 0.797. Similarly, the t-statistic for  $Y_t$  is 2.323, with a p-value of 0.797. In both cases, the p-values are greater than the conventional significance level (e.g.,  $\alpha = 0.05$ ), indicating that neither the constant term nor the coefficient of  $Y_t$  is statistically significant.

The F-statistic, which measures the overall significance of the model, is calculated to be 3.268. The associated p-value for the F-statistic is 0.0616, indicating marginal significance. This suggests that the model may provide some explanatory power, but it requires further investigation to determine its overall significance. The R-square value of 0.26 reveals that approximately 26% of the variation in  $C_t$  can be explained by the independent variable  $Y_t$ . This implies that  $Y_t$  has a moderate impact on  $C_t$ , leaving a substantial portion of the variation unaccounted for. The adjusted R-square, which accounts for the degrees of freedom in the model, is 0.18. The lower adjusted R-square suggests that the model may be slightly over fitting the data, indicating the need for caution when applying it to new observations.

In summary, the analysis shows a statistically significant relationship between  $Y_t$  and  $C_t$ , with  $Y_t$  having a meaningful impact on the dependent variable. However, the constant term and the overall model fit are not statistically significant, and a slight over fit is possible. Further investigation is required to validate the model's overall significance and address the potential over fitting issue.

**High-Income Group**

$$C_t = 10830 + 0.55Y_t + \varepsilon$$

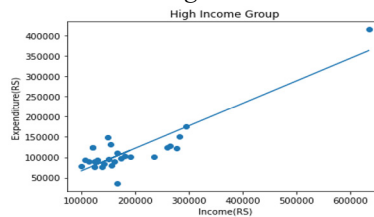
Std err 12200 0.55

T-test: 0.884 9.812

P-value: 0.385 0.000

F-Statistic: 488.2

Fig.3



**Middle-Income Group**

$$C_t = 23760 + 0.46Y_t + \varepsilon$$

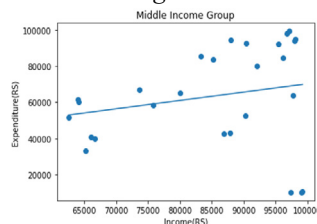
Std err: 36100 0.659

T-test: 0.419 1.108

P-value: 0.516 0.278

F-Statistic: 0.278

Fig.4





### Small-Income Group

$$C_t = 3814.08 + 0.92Y_t + \varepsilon$$

$$\text{Std err: } 7281.29 \quad 0.16$$

$$\text{T-test: } \quad 0.52 \quad 5.65$$

$$\text{P-value: } 0.605 \quad 0.000, \quad \text{F-statistic: } 32.01$$

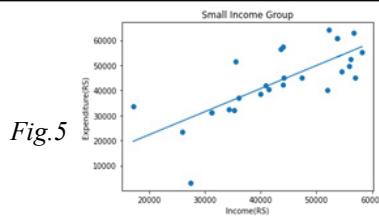


Fig.5

The study calculated three regression equations, standard errors, t-tests, p-values, and F-statistics using sample data from three income groups: high-income, medium-income, and low-income. For the high-income group, the regression equation was  $C_t = 10830 + 0.55Y_t$ , where  $C_t$  represents consumption and  $Y_t$  represents income. The constant's standard error was 12200, and the income coefficient had a standard error of 0.55. The t-test for the constant was 0.884 with a p-value of 0.385, indicating it was not statistically significant. The t-test for the income coefficient was 9.812 with a p-value of 0.000, indicating it was statistically significant. The R-squared value was 0.79, and the F-statistic was 488.2.

For the middle-income group, the regression equation was  $C_t = 23760 + 0.46Y_t$ , with the constant's standard error at 36100 and the income coefficient at 0.659. The t-test for the constant was 0.419 with a p-value of 0.516, indicating it was not statistically significant. The t-test for the income coefficient was 1.108 with a p-value of 0.278, indicating it was not statistically significant. The R-squared value was 0.047, and the F-statistic was 0.278.

Lastly, for the low-income group, the regression equation was  $C_t = 3814.08 + 0.92Y_t$ , with the constant's standard error at 7281.29 and the income coefficient at 0.16. The t-test for the constant was 0.52 with a p-value of 0.605, indicating it was not statistically significant. The t-test for the income coefficient was 5.65 with a p-value of 0.00, indicating it was statistically significant. The R-squared value was 0.56, and the F-statistic was 32.01.

Overall, the study found that the high-income group had a statistically significant income coefficient, indicating that consumption increases with income, while the medium-income group did not. The low-income group also had a statistically significant income coefficient, with a higher coefficient value and R-squared value than the medium-income group. Additionally, the scatter plots showed that the middle-income group's income levels were considerably further from the trend line than other two groups.

## Discussion

This study aimed to analyze consumption patterns in Nepal using national time series and local cross-sectional data. The focus was on exploring the relationship between current income and consumption at both levels, as well as calculating the marginal propensity to consume (MPC). The findings revealed that the national level MPC was 0.0000117, indicating that a significant portion of income was saved rather than spent on consumption. In contrast, the MPCs for the high, middle, and low-income groups were 0.55, 0.46, and 0.92, respectively. Surprisingly, the middle-income group was found to be statistically insignificant, suggesting that factors such as debt, savings, or expenses might influence on their consumption behavior more than income alone.

We noted that the national-level consumption was statistically insignificant, implying that other factors affecting consumption were not adequately considered. Furthermore, since the study focused on rural areas where agriculture is the primary source of income, the findings may not be generalizable to urban areas. Sacks et al. (2012) conducted a study on people's satisfaction levels based on absolute and relative income levels, finding that absolute income played a more significant role. Their research also indicated that well-being increased with higher absolute income levels, with wealthier individuals experiencing higher well-beings than lower incomes. Similarly, Yasmeen et al. (2019) examined the correlation between income and consumption in rural areas of Pakistan, revealing that absolute income



substantially impacted on consumption. People's consumption levels fluctuated in response to changes in their income. This study utilized primary and secondary data, but the results did not fully support the hypothesized relationship, given that the middle-income group and the national-level econometric model were not statistically significant.

The study was conducted specifically in a rural area where people primarily rely on agriculture or lack alternative sources of income for their daily lives. The major agricultural products for local farmers include paddy, wheat, lentils, corn, and mustard, which generate earnings. The study provides insights into the actual income and expenditure situations of the local population, making the results applicable for policy-making purposes in similar areas of the country. However, caution should be exercised when extrapolating these results to urban areas or generalizing them nationwide. Furthermore, it is important to consider that not all relevant independent variables were included in the study. For instance, the reasons behind the statistically insignificant income coefficient for the middle-income group could be explored, and the potential influence of factors such as debt, savings, or expenses on their consumption behavior should be further investigated.

Additionally, the study could discuss the policy implications of these findings. For example, suppose the consumption of low income individuals is more closely linked to income. In that case, policies aimed at increasing income, such as raising the minimum wage or expanding social welfare programs, may significantly impact on their consumption and overall well-being. Future research could expand the analysis by incorporating other consumption variables to gain a more comprehensive understanding of the situation.

## Conclusion and Recommendation

Consumption is an essential element in both macro and microeconomics. It may be tested with many sorts of data. The policy makers can use consumption pattern to guide taxation. This study is also based on time series and cross-sectional data. The time series data were obtained from a secondary source, while the cross-sectional data were obtained from a primary source. The linear regression model was created to investigate the relationship between income and consumption level. There are four MPC (Marginal propensity to consume), one at the national level and three at the local level. The four regression models were fitted, but only two are significant, and the other two are not significant i.e. middle - income group and national level.

The national-level analysis of the model revealed a weak connection between income and consumption, with a low degree of accuracy demonstrated by the R-squared value and F-statistic. The income coefficient was not shown to be a significant predictor of consumption, with an increase in income resulting in a predicted increase of 0.0000117. However, the intercept was not found to be a significant predictor of consumption, other unaccounted factors may be affecting consumption. Further research is recommended to identify and incorporate these additional factors to enhance the analysis. Specifically, the regression equations for three income groups showed that income and consumption were more strongly related in the high and low-income groups. In contrast, income may not significantly impact consumption in the middle-income group. It is also assumed that other influencing aspects of consumption, such as debt, savings, prior income, past consumption, and population size, are not considered here. Other researchers use them to investigate the relationship between these factors and consumption.

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